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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/770,540	01/26/01	SCHUEGARAF	K MICRON. 8DV

020995 MMC1/0718
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EXAMINER

SCHILLINGER,L

ART UNIT

PAPER NUMBER

2813

DATE MAILED: 07/18/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/770,540

Applicant(s)

SCHUEGARAF, KLAUS F.

Examiner

Laura M Schillinger

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 09 July 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) 1-5, 13-19, 21 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 9-10 is/are allowed.
- 6) ☒ Claim(s) 6-8, 11, 12, 20 and 22-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Claims 1-5 and 13-19 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected Groups I,III and IV, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in Paper No. 3.

Allowable Subject Matter

The following is a statement of reasons for the indication of allowable subject matter: In reference to claim 9-10, prior art fails to teach in the structure comprises exposing the electrode to a refractory metal-halide complex. Batra teaches a halide anneal gas (Col.2, lines: 60-65 but fails to teach treating the structure to a **metal**-halide treatment, as claimed by the applicant.

Prior art fails to teach roughening a Si structure through a metal halide treatment.

It would not have been obvious to replace the Ge halide complex taught by Batra with the metal halide disclosed by the applicant because the resulting structure would not oxidize through exposure. However a metal halide could oxide as a result of exposure which may provide the advantage in capacitor applications by forming a barrier for a capacitor dielectric.

Claim Rejections - 35 USC § 102

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The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

Claims 6-8, 20, and 22-24 are rejected under 35 U.S.C. 102(e) as being anticipated by Batra ('500).

In reference to claim 6, Batra teaches a method comprising:

Forming a Si electrode on a wafer (Abs., lines: 1-5);

Texturizing the Si electrode (Abs., lines: 1-5);

Replacing the Si in the Si structure with a metal to thereby form a textured metal electrode (Abs., lines: 1-10).

In reference to claim 7, Batra teaches further comprising covering the electrode with a high dielectric constant material (Col.6, lines: 20-25).

In reference to claim 8, Batra teaches further comprising covering the dielectric with a metal (Col.6, lines: 20-25).

In reference to claim 20, Batra teaches a method comprising:

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Forming a metal electrode with a textured surface (Fig.6 (86));

Covering the surface with a dielectric (Fig.6 (90));

Covering the dielectric with a second electrode (Fig.6 (92)).

In reference to claim 22 Batra teaches further including seeding and annealing (Abs., lines: 1-10).

In reference to claim 23, Batra teaches wherein the metal comprises hemispherical grain Si morphology (Abs., lines: 1-5).

In reference to claim 24, Batra teaches wherein the metal electrode comprises forming a rugged Si layer and converting it to metal (Col.4, lines: 55-65).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Batra ('500) as applied to claims above, and further in view of Zahurak et al ('434).

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Batra ('500) fails to explicitly teach implementing Ti rather than Ge to roughen Si electrodes, however Zahurak et al ('434) teaches roughening Si electrodes through Ti to form a capacitor. It would have been obvious to replace the Ge dopant as taught by Batra with the Ti because Zahurak teaches that Ti may be used to accomplish the same roughened electrode structure.

In reference to claim 11, Zahurak teaches wherein the dielectric is: TiOx (Col.7, lines: 55-65)

In reference to claim 12, Zahurak teaches wherein the metal is Ti (Abs., lines: 1-20).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Batra and Zahurak teach similar methods in ('355) and ('655), respectively.

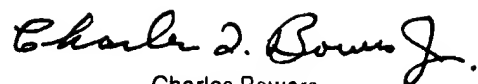
Any inquiry concerning this communication from examiner should be directed to Laura Schillinger whose telephone number is (703) 308-6425. The examiner can normally be reached by telephone on Monday to Friday from 6:30 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Charles Bowers, can be reached on (703) 308-2417. The fax phone number for the group is (703) 308-7722.

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LMS

July 16, 2001



Charles Bowers

Supervisory Patent Examiner
Technology Center 2800